

**ASSESSING THE EFFECTIVENESS
OF MILESTONE BUDGETING**

**The Congress of the United States
Congressional Budget Office**

NOTE

Unless otherwise indicated, all years used in this report are fiscal years.

PREFACE

The Congress is currently considering ways to improve the efficiency of acquiring weapons systems for the nation's defense. One alternative, endorsed by the President's Commission on Defense Management (Packard Commission), would approve multiple years of advanced funding for weapons systems, based on milestones that occur during the acquisition process. Last year, the Congress authorized the use of "milestone budgeting" and requested that the Department of Defense designate several programs to test its effectiveness.

In order to assist the Congress in its deliberations on milestone budgeting, the Senate Budget Committee requested that the Congressional Budget Office (CBO) examine its potential advantages and disadvantages and issues related to implementation. In accordance with CBO's mandate to provide objective analysis, the report makes no recommendations.

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SUMMARY

In 1986, the Congress enacted legislation that directed the Secretary of Defense to designate several weapons programs for Congressional consideration as possible candidates for "milestone budgeting." Milestone budgeting is a new method of funding under study by the Congress to replace, at least partially, the annual budget process for the research and development (R&D) and procurement of weapons systems. Under the legislation that authorized the milestone approach, the Congress could approve up to five years of program funding in advance. Milestone budgets would be based on program estimates established at the development and production milestones that occur during the weapons acquisition process. (See box for a description of milestones.) Unless problems arose, the Congress would not again review program authorization--and perhaps appropriation--until the next milestone or until five years had elapsed.

The primary purpose of the legislation is to increase program stability, which, in turn, would enhance program management. Milestone budgeting would also reduce program costs and workloads on reviewers in Congress and the Department of Defense (DoD). Recently endorsed by the Packard Commission on Defense Management, the milestone budgeting concept has also been supported in a number of other major reviews of the defense acquisition process, including the Report of the Commission on Government Procurement (1972), the Defense Resource Management Study (1979), and the Carlucci Initiatives (1981). In order to assist the Congress in its deliberations concerning further implementation of milestone budgeting, this study examines its potential advantages and disadvantages, and discusses issues related to formulating an implementation plan.

POTENTIAL ADVANTAGES AND DISADVANTAGES OF MILESTONE BUDGETING

Generally, milestone budgeting could alter the incentives motivating defense program managers, causing them to focus more on longer-term issues and project management rather than each year's funding requests. Milestone budgeting could also offer more specific advantages--and some problems--as discussed below.

ACQUISITION MILESTONES AND PHASES

Milestone 0--Justification for Major System New Start (JMSNS)

A review by the Defense Resources Board (DRB) of the need for a new major weapon system proposed by the services or the staff of the Office of the Secretary of Defense.

Concept Exploration Phase

Follows Milestone 0. Program office identifies alternative approaches to fulfilling mission need stated in JMSNS. Establishes initial technical specifications and cost and schedule estimates. Develops test and evaluation plan and identifies critical technical issues.

Milestone I--Concept Validation

Defense Acquisition Board (DAB) reviews and validates conceptual approach proposed by service to meet requirement. DAB establishes planning baseline cost, schedule, and performance thresholds to be met at Milestone II. DAB reviews and validates test and evaluation (T&E) and logistics and support plans and acquisition strategy.

Demonstration and Validation Phase

Follows Milestone I. Program office directs preliminary engineering and design work and analyzes cost, performance, and schedule trade-off options. Contractor develops prototypes to demonstrate feasibility of system, subsystems, components, and test and support equipment. Principal areas of risk and alternative solutions identified. Initial design reviews and development testing conducted.

Milestone II--Full-Scale Development Milestone

Defense Acquisition Board reviews results of the Demonstration and Validation Phase and recommends program go-ahead when system feasibility demonstrated. Program cost, schedule, performance thresholds are updated and serve as development baseline for reports to the Congress. Test and Evaluation Master Plan (TEMP), acquisition business strategy, and support and logistics plans reviewed and updated.

Full-Scale Development Phase

Follows Milestone II. System is fully developed, engineered, and fabricated. Test items are built. Development and operational testing are conducted on system, subsystems, and components. Engineering and design changes occur and preparations for transition to production made.

Milestone III--Production Approval

Defense Acquisition Board reviews results of full-scale development phase and recommends approval to enter production phase. (Decision may be delegated to service secretaries if Milestone II baseline thresholds not breached.) Milestone may be separated into initial (IIIA) and full-rate (IIIB) production milestones. Milestone IIIA may be elected to provide test items and reduce technical manufacturing risks. Operational testing must be complete and certified acceptable to the Congress by the Secretary of Defense before entering full-rate production.

Program Stability

Historical program and budget data indicate that developing and purchasing weapons systems is a very unstable business in which program plans are often not fulfilled. For example, a majority of major weapons programs, reported by DoD to the Congress in the *Selected Acquisition Reports* (SARs), have not met planned schedules. Funding for both development and production programs has also been unstable. According to budget data from fiscal years 1982 through 1986, funding authorized by the Congress for development programs has differed by more than 10 percent from DoD's plan of the previous year for more than 80 percent of the time. For 66 percent of the time, production quantities were changed by more than 5 percent from the previous year's plan. Many of these changes appear related to budget constraints. According to the SARs, about 63 percent of program costs in excess of baseline estimates resulted from changes in production quantities, which were often reduced because of altered budgets. Technical or engineering changes accounted for only 16.6 percent of the cost increases.

Would milestone budgeting improve program stability? It need not, since the Congress could always revisit programs before their next milestone and enact changes. But experience with another form of long-term budgeting--multiyear contracts--suggests that the Congress usually does not make major changes in programs approved for long-term contracts. The long-term funding under milestone budgeting might also inspire legislative continuity.

Savings

Milestone budgeting could achieve significant savings as a result of increased program stability. The greatest potential for savings lies in avoiding added costs associated with program stretchouts. The Congressional Budget Office (CBO) has estimated that production stretchouts between 1981 and 1984 added an average of \$4 billion (in budget authority) each year to total acquisition costs. The results of multiyear contracts are again an indicator of possible milestone effects--in this case potential savings. A review of 46 multiyear contracts suggests savings of about 12 percent relative to the probable costs of buying the same number of weapons using annual contracts. Because programs approved for multiyear contracts are chosen partially because they are already stable, comparable savings might not occur if milestone budgeting were applied widely. They do, however, suggest the potential for the degree of cost reduction that could be obtained through the use of milestone budgeting.

Workload Reduction

Milestone budgeting could potentially reduce the budget review workload both for DoD and the Congress. Under this approach, program reviews would not occur every year but rather at milestones, at designated intervals, or at the breaching of a program threshold. The extent to which the review workload could be lowered would depend primarily on the design of the milestone budgeting system. If, for example, budgets for all programs in the SAR reports were structured to last until the next milestone (but no more than five years), then the number of budget reviews could be reduced by as much as 75 percent over a 10-year period according to an analysis of data for the 1976-1986 period. Workload reduction would also be influenced by other factors, such as whether milestone funding is both authorized and appropriated by the Congress or just authorized (an issue discussed more fully below). In addition to the possible reduction in the quantity of the budget review workload, milestone budgeting could improve the quality of the reviews as fewer reviews could permit more detailed assessment of each program.

Problems of Flexibility and Variability

Milestone budgeting could also cause some problems. Depending on the number of programs included, the milestone approach could lead to the exemption of a significant portion of the defense budget from review each year. The Congress, therefore, would have less flexibility to adjust individual programs or to reallocate significant portions of the budget. If applied to all SAR programs over the 1976-1986 period, for example, milestone budgeting based on five years' funding would have exempted about 15 percent of R&D funds and 27 percent of procurement funds from annual reviews.

Milestone budgeting could increase program instability for nonmilestone programs. If the Congress committed a certain portion of the defense budget to milestone programs, and if the total DoD budget authorized by the Congress were reduced below planned levels, all program adjustments required to meet budget constraints would be borne by nonmilestone programs. The Congress could, of course, choose to adjust funding already provided for milestone programs, but this would negate the benefits of stability.

Milestone budgeting could also increase variation in the defense budget. Section 906 of the 1987 Defense Authorization Act states that the Congress shall authorize funding for milestone programs "in a *single*

amount sufficient to carry out that (acquisition) stage, but not for a period in excess of five years...." (Emphasis added.) If the Congress authorized and appropriated such funding in a lump sum, a significant degree of variability in the defense budget could ensue if several large programs reached their milestones in the same budget year. For example, an analysis based on historical budget data and assuming milestone budgeting for all SAR programs indicates that lump-sum funding could have required a 25 percent increase in the total DoD budget in 1982.

On the other hand, milestone budgeting could be managed in ways that would avoid, or at least minimize these problems. The Congress could eschew lump-sum funding by approving needed funds for several years but allocating them by year. For its part, DoD could prevent several large programs from arriving at their milestones in the same year. Programs subject to milestone budgeting could be limited to a number that would not produce unacceptable levels of budget inflexibility or variability.

ISSUES IN FORMULATING A MILESTONE BUDGETING PLAN

The 1987 Defense Authorization Act initiated the use of milestone budgeting for a limited number of programs that were labeled Defense Enterprise Programs (DEPs). The desirability and direction of expanding its use will be influenced by the costs and benefits derived from the DEP programs. In anticipation of the results of this test, the Congress may desire to develop a plan to proceed with broader implementation of milestone budgeting. If so, a number of issues merit consideration.

Number of Programs

One key issue is the number of programs to be included under milestone budgeting. By restricting the use of milestone budgeting to a few programs, the potential savings generated by improved program stability would be limited. The flexibility of the Congress to make budget adjustments, however, would be largely unaffected. On the other hand, while universal application of milestone budgeting could save greater sums, it would probably also exact a cost in budget flexibility.

One specific alternative would limit milestone budgeting to some or all major programs--defined as programs reported in the SAR reports. Major programs account for about half the procurement budget and 15 percent of the R&D budget. The Congress might also wish to include selected

smaller programs. Since there are some 1,800 of these programs, including all of them could create administrative difficulties.

Milestones to Be Included

A second issue concerns the acquisition milestones to which milestone budgeting would apply. The current legislation permits milestone authorization for programs either entering or in full-scale development (Milestone II) or in full-rate production (Milestone IIIB). Other acquisition milestones could be covered, including initial program approval (Milestone 0); concept validation (Milestone I); and initial, low-rate production (Milestone IIIA).

The decision of which milestones to include in the budgeting scheme for each program should consider the degree of risk in meeting the planned requirements. If a program is unable to meet the cost, schedule, and performance plans established at a milestone, reviews of program plans between milestones might be necessary. These "revisits," however, would defeat the purpose of milestone budgeting and could also complicate the budget management process. The risk of breaching program plans generally decreases from early acquisition stages, when relatively little about a system may be known or tested, to the latter stages, when items are produced and become operational. Risk also varies according to individual programs, which suggests that milestone budgeting might best be considered on a program-by-program basis without presetting limits on which milestones should be included.

Duration of Milestone Funding

The risk that a planned threshold could be breached would also be affected by the length of time for which milestone funding would be provided. In general, the longer the period of funding, the greater the risk would be. Other factors, however, might also have an effect. Programs with low technical risk, for example, might be appropriate for longer periods of milestone funding. Again, these factors suggest that the decision should be made on a case-by-case basis.

Several choices of duration are available. The 1987 Authorization Act authorizes milestone funding sufficient to proceed to the next milestone, unless that period exceeds five years. The Congress could consider providing funds for a shorter period, such as two years, which would be compatible with the two-year budget cycle now being discussed (biennial budgeting), and

which would provide for greater budget flexibility than the five-year option. A two-year milestone funding period, however, might not provide the same degree of workload reduction and savings as a longer period.

Manner of Funding

The manner in which milestone funding is provided--whether lump sum or annual--is also an important issue. Suppose a program was expected to cost \$3 billion--\$1 billion in year one and \$2 billion in year two (all in budget authority). The Congress could provide all \$3 billion in a lump sum the first year, to be spent as needs dictate. Or the Congress could approve spending \$3 billion but require that no more than \$1 billion be obligated in year one and \$2 billion in year two. Lump-sum funding would maximize managerial discretion and provide the greatest assurance that funds would be available; these benefits could increase chances for efficiencies and savings. The current test legislation calls for funding "in a single amount," which could permit lump-sum funding. But lump-sum funding could also generate variability in the defense budget if several large programs reached their milestones in the same budget year.

Authorization and Appropriation

One key decision in the design of a milestone budgeting plan concerns whether funds for milestone programs would be authorized only (which would set policy and permit funds to be spent but not make funds available) or both authorized and appropriated (which would set policy and provide funds). The armed services authorizing committees have proposed milestone budgeting; in the past they have been more inclined toward multiyear commitments of DoD funds than have the appropriations committees.

The greatest potential for ensuring program stability and reducing the budget review workload could be achieved if milestone funding were both authorized and appropriated at the same time. Benefits could still be achieved if milestone funding were only authorized, since such a statement by the Congress might increase the chances of full annual appropriations. But workloads would be reduced less, because preparations would continue to be required for the annual appropriation debate. Moreover, program adjustments during the appropriation process could reduce the stability sought by milestone budgeting. Considering historical practices, a significant risk exists that program instability would occur. A review of major R&D and procurement programs during the 1982-1987 periods indicates that appropri-

ated funds differed by greater than 10 percent from authorized amounts for more than 20 percent of the time.

FUTURE STEPS

The DoD has recently proposed three weapons systems for a test of milestone budgeting, and the Congress may approve them. Because those systems would take several years to reach their next milestone, this test will not be complete until the early 1990s. The Congress could continue approving a few programs each year for milestone budgeting, thereby expanding the test modestly while awaiting results.

If results suggest that milestone budgeting is desirable, the Congress will have to consider how to implement the process more fully. One gradual form of implementation would institute milestone budgeting only as new and appropriate programs reach applicable milestones. Under this form of transition, many years would be needed to implement milestone budgeting fully, but this approach would avoid the surge of milestone reviews that would occur if the process were applied to all existing programs simultaneously.

CHAPTER I

INTRODUCTION

In fiscal year 1987, the Department of Defense (DoD) will spend about \$121 billion in budget authority for research, development, and procurement of weapons and their support systems. Before reaching the armed forces, each of these items will progress through many stages--from idea to development to production. 1/ Normally, each stage in the acquisition process requires more than one year to complete. For most weapon systems, however, DoD annually reviews the programs, seeks Congressional approval, and funds contracts to complete successive portions of work.

BACKGROUND

In April 1986, the President's Blue Ribbon Commission on Defense Management (the Packard Commission) proposed a major change to the budget process by which weapons are developed and acquired. The proposed change, called "milestone budgeting," recommends a new approach based on the stages, or milestones, that occur in the weapons acquisition process. The 1987 Defense Authorization Act required a limited test of this new budgeting technique under the title of "Defense Enterprise Programs."

Under milestone budgeting, DoD and the Congress would decide to fund a program at certain major milestones, and, unless problems developed, would not review the program again until the next milestone occurred or five years had passed, whichever came first. 2/ A decision could be made at each of four basic acquisition milestones (see box for description): 3/

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1. The terms "production" and "procurement" are sometimes used interchangeably. In this context, production refers to the phase in the acquisition process in which items are manufactured; procurement refers to the funding of production programs in the budget process.
 2. While the Constitution limits appropriations for the Army to a maximum term of two years (article I, section 8, clause 12), over the years this provision has not applied to the purchase of military equipment. Consequently, the Constitution does not bar multiyear budgeting through practices such as milestone budgeting for defense procurement programs. For further discussion, see Louis Fisher, *Constitutional Conflicts Between Congress and the President* (Princeton, N.J.: Princeton University Press, 1985), pp. 318-23.
 3. The Department of Defense is currently revising the acquisition milestone structure, but will retain the four milestones identified below.

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Milestone I--Concept Validation

Defense Acquisition Board (DAB) reviews and validates conceptual approach proposed by service to meet requirement. DAB establishes planning baseline cost, schedule, and performance thresholds to be met at Milestone II. DAB reviews and validates test and evaluation (T&E) and logistics and support plans and acquisition strategy.

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Milestone II--Full-Scale Development Milestone

Defense Acquisition Board reviews results of the Demonstration and Validation Phase and recommends program go-ahead when system feasibility demonstrated. Program cost, schedule, performance thresholds are updated and serve as development baseline for reports to the Congress. Test and Evaluation Master Plan (TEMP), acquisition business strategy, and support and logistics plans reviewed and updated.

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- o Milestone 0--Justification for a Major System New Start (JMSNS),
 - o Milestone I--Concept Demonstration and Validation,
 - o Milestone II--Full-Scale Engineering Development, and
 - o Milestone III--Production.

Major milestones normally occur at irregular intervals during the acquisition process, with each phase usually requiring several years or more to complete. Milestone budgeting would, therefore, reduce the frequency of reviews. According to proponents of this approach, fewer program reviews during the budgeting process would reduce mid-procurement changes in weapons programs, lower program costs, and decrease the workload for both the Congress and DoD. Improved program stability and lower costs are critical elements to ensuring overall affordability of defense programs, particularly during periods of constrained budget growth or real reductions.

In addition to providing advantages, however, milestone budgeting could raise some problems. These include increased year-to-year variation in budget totals and the potential need to reduce spending of funds already committed through milestone budgeting as a result of future budget constraints.

As the Congress considers milestone budgeting, it must make choices concerning a number of issues: how many and what type of systems would be covered, which milestones would be subject to review, how long a period would elapse between reviews, and what program problems might trigger a special review. The Congress must also decide whether milestone budgeting would apply only to authorization of the system (which would allow the program to proceed, but would not provide funds) or to both authorization and appropriation of funds.

OTHER SPECIAL BUDGETING TECHNIQUES

While this study focuses on milestone budgeting, this new budgeting technique should be studied in light of related approaches currently being considered or used by the Congress. For example, a two-year defense budget has been prepared by the Administration for fiscal years 1988 and 1989 and will be debated by the Congress this year. In addition, multiyear contract-

ing for major weapon programs has been in place for many years and has become a major means for increasing budgetary stability for production programs.

Two-Year Budgeting

At the request of the Congress, the Administration submitted a two-year defense budget request this year. The purpose is to provide greater stability to defense programs through Congressional budget approval that extends for more than one year. In certain respects, the preparation of a two-year budget does not represent a departure from past practices. For a number of years, DoD has annually submitted a budget request that has included the planned request for the following year. In previous years, however, the Congress has acted only on the request for the upcoming budget year, disregarding the planned budget request for future years. This year, however, the Congress plans to make decisions on the defense budget for both 1988 and 1989.

Unless the Congress chooses to defer action on the 1989 budget, the Administration will not submit another defense budget request until 1990. At issue is whether or not the Congress will decide both to authorize and to appropriate funds for a two-year period. Alternatively, the Congress could choose to authorize a program for a two-year period, but continue to appropriate funds on an annual basis. This alternative would probably require the Administration to submit a budget appropriation request for 1989 to supplement the current DoD budget request submission for 1988-1989.

Milestone budgeting could be consistent with a two-year budgeting cycle by scheduling program reviews every two years. The analysis in this study includes consideration of a two-year budget cycle and its possible effect on the variables affecting the potential costs and benefits of milestone budgeting.

Multiyear Contracting

Multiyear contracting is another approach to budgeting for major weapon programs that has been introduced in recent years to provide greater stability to defense acquisitions. In 1982, the Congress enacted legislation that authorized DoD to purchase major weapon systems and their components using multiyear contracts that could include purchasing items "in economic order quantities" (EOQ). Since then, the Congress has authorized multiyear contracts covering up to five years for 46 major weapon systems. Multiyear

programs, however, are still subject to annual budget reviews; each year, DoD submits budget requests for authorization and appropriation of funds for Congressionally approved multiyear programs. In a recent review of multiyear contracting for major weapon programs, the Congresssional Budget Office (CBO) has determined that, under the current budgetary process, multiyear contracts have essentially met the goals of greater stability and cost savings. 4/

As with a two-year budget, milestone budgeting could be consistent with multiyear contracting by stipulating that program reviews would occur at intervals corresponding to the length of a multiyear contract. In effect, milestone budgeting could simply be another form of multiyear contracting, possibly differing only with regard to limits on programs that could be covered. Currently, multiyear programs must be production programs that meet specific criteria identified in the law. Under milestone budgeting, all programs--including developmental programs--could be authorized for multiyear funding unless the Congress chose to establish criteria of selection for milestone programs or limited the scope of milestone funding.

Because of the similarities that exist between multiyear contracting and milestone budgeting, the experience of the former could be instructive in considering the possible effects of the latter. This study, therefore, includes a discussion of multiyear contracting performance and an assessment of the potential impact of five-year funding on the variables influencing the potential costs and benefits of milestone budgeting.

4. Congressional Budget Office, *Alternative Strategies for Increasing Multiyear Procurement* (July 1986).